

## **REMARKS**

### **I. Introduction**

Claims 1 to 12 are pending in the present application, all of which have been rejected. In view of the following remarks applicants respectfully submit that the claims are now in condition for allowance.

### **II. Rejection of Claims Under 35 U.S.C. § 112**

Claim 1-12 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Office Action states that the limitation “safely useable” amount of a first initiator in the claims is not defined therein, the specification does not provide a standard for ascertaining the requisite amount, and one of skill in the art would not be reasonably apprised of the scope of the invention. Further, in response to applicants’ arguments that “the safely useable amount ... relates to the amount of initiator that would be used when the polymerization process is run at its maximum rate with all initiator being added at the start of the polymerization process,” the Examiner asserts that it is unclear how the safely useable amount can be correlated to the reaction’s maximum rate. According to the Examiner it is also unclear whether the maximum rate occurs when all the initiator is added at the start of the polymerization process. Finally, the Examiner asserts that there are no specific examples in the specification of unsafe amounts of initiator, or of unsafe reaction rates.

Applicants respectfully submit that although applicants previously submission of relating the safely useable amount to the maximum rate when all the initiator is added may have remained unclear, Applicants submit that, as supported by the specification the safely

useable amount relates to the maximum cooling capacity. See the definition on page 4, lines 5-9 and 15-16 of the specification. Polymerization reactions using initiators are exothermic and generate a lot of heat. As explained on page 2, lines 1-9, excessive heat development may cause the temperature in the reactor to increase above the desired temperature, causing more initiator to decompose, causing a further increase in temperature, leading to dangerous situations. In order to control the reaction, it is therefore important to cool the reactor. The cooling capacity of a reactor – i.e. the amount of heat that can be removed from the reactor – is, however, limited to a certain value, which is the maximum cooling capacity.

It will be clear that when more initiator is used, more heat will be generated. Accordingly, the “safely useable amount” is defined on page 4 as being the maximum amount of initiator that can be used in an identical process that is run at the maximum cooling capacity and whereof the temperature is not exceeding the set temperature due to an excess of polymerization heat. It is impossible for Applicant to specifically quantify the amount in the claims for the safely useable amount, because that will depend both on the reactor type, its cooling capacity, the nature of the first initiator, and on the conditions at which the process is carried out (temperature, pressure). However, the description does provide a clear teaching to the skilled person on how to calculate said amount.

The safely useable amount is further illustrated in the Examples. In Comparative Example A, 656 ppm of a conventional initiator was used as the sole initiator. It was found that this amount of 656 ppm was the maximum amount of this initiator that could be used whereby the reaction mixture did not exceed the desired temperature of 57°C (see also the Table on page 17;  $T_{\text{incr}}=0$ ). Hence, this amount of initiator was the safely useable amount of first initiator. Further applicants submit that claim 1 requires the first initiator to be added in an amount of not more than 90% of the safely useable amount. In the Table on page 17, this use of 90% or less of the safely useable amount of first initiator (Examples 1

and 2) is compared with the use of 100% of the safely useable amount (Comp. Example B), all in combination with dosing of a second initiator. These experiments show that the use of 100% of the safely useable amount (Comp. Example B) results in a run away of the reaction temperature to 6°C above the desired temperature of 57°C. This is not only undesired for safety reasons, but the higher temperature may also result in obtaining a different polymer grade. Therefore, in contrast to the Examiner's assertions the application does contain an example wherein more than 90% of the safely useable amount is used in combination with a second initiator, which comparative example shows a process that leads to undesired effects.

Accordingly, the "safely useable" amount of a first initiator as recited in the claims relates to the maximum amount of initiator that can be used in an identical process that is run at the maximum cooling capacity and whereof the temperature is not exceeding the set temperature due to an excess of polymerization heat. As such the meaning of the term "safely useable" would be immediately clear to the skilled artisan considering the disclosure on page 4, lines 5-9 and 15-16 of the specification. Therefore, applicants respectfully submit that the claimed subject matter is clearly defined in claim 1, and in claims 2-12 which depend either directly or indirectly from claim 1.

Thus, Applicant respectfully submits that the rejections of claims 1-12 under 35 U.S.C. § 112, second paragraph, have been overcome and should therefore be withdrawn.

### **III. Rejections of Claims Under 35 U.S.C. § 103**

Claims 1-8, 11, and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,384,155 ("Van Swieten et al.") as evidenced by the Akzo-Nobel product data sheets for Trigonox EHP and Trigonox 187 and as further evidenced by the Remarks filed by applicant on April 13, 2009 . Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Van Swieten et al. in view of U.S. Patent

No. 6,274,690 (“Hoshida et al.”). Claim 10 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Van Swieten et al. Applicant respectfully submits that these rejections should be withdrawn for at least the following reasons.

The Office Action asserts that Van Swieten et al. discloses a suspension polymerization process of vinyl chloride using a first initiator and a second initiator which at the cited polymerization temperature of 57°C have a half life of 3.1 and 0.1 hours respectively. According to the Office Action the reference fails to disclose an “unsafe” reaction or a runaway polymerization and therefore the amount of initiators in Van Swieten et al inherently meets the “at most 90% of the safely useable amount” as in the present claims. Further the Office Action asserts that the cooling capacity of the method disclosed in Van Swieten et al. is inherent to the process. With respect to the requirement in the claimed invention to add the second initiator at least partially between the start of the polymerization until 10% of the monomer has been polymerized, the Office Action states that the monomer conversion of 12% in the process disclosed by Van Swieten et al, as evidenced by applicant in the April 13, 2009 response, is in value close enough that the skilled artisan would have expected the same properties from the resulting reaction. According to the Office Action the skilled artisan would expect that adding an initiator at a different point in the reaction would lead to predictable changes in the polymer’s properties, such as molecular weight, molecular weight distribution, and processability characteristics. Moreover the Office Action states that the point of commencement and the duration of the initiator feed are result effective variables because changing them will clearly affect the type of product obtained, including the polymer’s physical properties. According to the Office Action discovery of an optimal value of a result effective variable in a known process is ordinarily within the skill of the art. With respect to the rejection of claim 9, the Office Action asserts that in view of Hoshida, disclosing polymerizing vinyl chloride monomer with reactors of at least 40 m<sup>3</sup>, it would

have been obvious to the skilled artisan to have scaled up the process of Van Swieten et al. With respect to the rejection of claim 10 the Office Action asserts that while Van Swieten et al fails to specifically disclose variable dosing of the first initiator in a polymerization using two initiators, the cited reference teaches generally that the initiators may be dosed continuously. Therefore, it would have been obvious to the skilled artisan to modify the process in Van Swieten et al to arrive at the currently claimed invention.

Applicant respectfully disagrees with these assertions for at least the following reasons. As previously submitted Van Swieten et al. does not disclose nor suggest the presently claimed invention considering that the cited reference fails to teach or suggest a second initiator “dosed at least partially from the start of the polymerization until 10% of the monomer(s) has been polymerized, which deficiency is not cured by the secondary references cited by the Examiner. It appears that the Examiner has applied impermissible hindsight analysis to piece together applicants’ invention. See, *In re Fitch*, 972 F.2d 1260 (Fed. Cir. 1992) (“ [I]t is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so as that the claimed invention is rendered obvious . . . . . This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”); quoting from *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). See also *In re Zurko*, 111 F.3d 887 (Fed. Cir. 1997), *reh’g in banc granted*, 116 F.3d 874 (Fed. Cir. 1997), *rev’d*, 142 F.3d 1447 (Fed. Cir. 1998), *rev’d sub nom. Dickinson v. Zurko*, 527 U.S. 150 (1999), *on remand*, 258 F.3d 1379 (Fed. Cir. 2001) (“[T]o say that the missing step comes from the nature of the problem to be solved begs the question because the Board has failed to show that this problem had been previously indentified anywhere in the prior art.”). Therefore, the rejection raised under 35 U.S.C. § 103(a) over Van Swieten et al as evidenced by Akzo-Nobel product data sheets for Trigonox EHP and Trigonox 187 or in view of

Hoshida et al is apparently based on improper hindsight. Further, in determining obviousness, “the inquiry is not whether each element existed in the prior art, but whether the prior art made obvious the invention as a whole for which patentability is claimed.” *Hartness International Inc., v. Simplimatic Engineering Co.*, 819 F.2d 1100 (Fed. Cir. 1987), see also *Custom Accessories, Inc., v. Jeffrey-Allan Industries Inc.*, 807 F.2d 955 (Fed. Cir. 1986) (“[c]asting an invention as a combination of old elements leads improperly to an analysis of the claimed invention by parts, not by the whole.”). For this reason alone applicants submit that the claimed invention is not taught or suggested by the cited references.

In addition to applicants previous arguments applicants submit that Van Swieten et al relates to a process wherein essentially all peroxides used have a half-life of from 0.05-1.0 hour at the polymerization temperature. A process according to the present invention using two initiators, one having a half-life of 0.0001-1.0 hour and another one being more temperature stable is NOT disclosed or taught in Van Swieten et al EXCEPT for comparative Example F. This is a comparative example, because it uses two peroxides, only one of them (Trigonox 187) having a half-life in the range 0.05-1.0 at the polymerization temperature, the other being more stable. Van Swieten makes clear that the process disclosed therein is preferred over the process of comparative Example F. This is evident for example in the paragraph bridging pages 2 and 3, where Van Swieten refers to JP-A-07082304 and states that the use of a more stable peroxide at the beginning of the polymerization results in an unacceptably high residue of peroxide in the final polymer. This is confirmed by Van Swieten's Comparative Example F, which also resulted in a high amount of peroxide residue. Van Swieten thus teaches against the process of comparative Example F. Therefore, contrary to the Examiner's assertions, Van Swieten et al teaches away from employing two initiators, one having a half-life of 0.0001-1.0 hour and another one being more temperature stable. See, *Ashland Oil* indicating that a reference must be considered for all it teaches, including

disclosures that teach away from the invention as well as disclosures that point toward the invention. *Ashland Oil Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281 (Fed. Cir. 1985), cert denied, 475 U.S. 1017 (1986) (“A reference, however, must have been considered for all it taught, disclosures that diverged and taught away from the invention at hand as well as disclosures that pointed toward and taught the invention at hand”) citing *W.L. Gore & Associates, Inc., v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983). Therefore, the skilled artisan reading the entire disclosure of Van Swieten et al would be taught away from the presently claimed invention. The skilled artisan reading Van Swieten's Comparative Example F and desiring to optimize this process will indeed be taught how to do this: use the process according to Van Swieten's disclosure. However, the skilled artisan will NOT be taught to modify the process of Example F by changing the moment of adding the second initiator. The skilled artisan will not consider optimizing a process of a Comparative Example disclosed in a patent application that clearly teaches against said process.

Furthermore, the requirement that at least 92% of the maximum cooling capacity of the polymerization reactor is used during at least a period of time wherein at least 10% by weight of the monomer is polymerized is not met in Comparative Example F of Van Swieten due to the late start of dosing the second initiator in said Example. This is shown in the Figure on page 4 of the declaration of Van Swieten. This Figure shows a maximum rate around 3.9 hours of polymerization time. When the temperature is kept constant (as in said Example), the required cooling is proportional to the reaction rate. It cannot be deduced from this figure whether the maximum cooling capacity is indeed achieved at this maximum rate, but it is certain that if the maximum cooling capacity is achieved at all in this Example, it is only at the maximum rate and, considering the sharpness of the rate-maximum, only for an instant. Thus, this figure shows that the requirement that at least 92% of the maximum cooling capacity of the polymerization reactor is used during at least a period of time wherein

at least 10% by weight of the monomer is not met by Comparative Example F. Therefore, the second initiator in Example F of Van Swieten et al. is not “dosed at least partially from the start of the polymerization until 10% of the monomer(s) has been polymerized,” as is presently claimed in independent claim 1 from which dependent claims 2-12 all ultimately depend, and thus include this limitation as well. Accordingly, Van Swieten et al. does not disclose nor suggest the presently claimed invention considering that the cited reference fails to teach or suggest a second initiator “dosed at least partially from the start of the polymerization until 10% of the monomer(s) has been polymerized.

The skilled artisan, reading Van Swieten et al and desiring to increase the initiator efficiency (that is: a process which requires less initiator) and use the maximum cooling capacity, would have no guidance from the cited reference on how to achieve this, let alone that such a skilled artisan would be inclined to achieve this by using at most 90 wt% of the safely usable amount of a first initiator, to dose the second initiator within the first 10% conversion and in an amount such that at least 92% of the maximum cooling capacity is used in this 10% conversion. Therefore, applicants respectfully submit that the presently claimed invention is not obvious in view of Van Swieten et al.

In addition, Hoshida et al. cure the shortcomings of Van Swieten et al. That is, Hoshida et al. fails to teach or suggest a second initiator “dosed at least partially from the start of the polymerization until 10% of the monomer(s) has been polymerized.”

Therefore, none of the cited references, alone or in combination, teach or suggest the presently claimed process which includes a second initiator “dosed at least partially from the start of the polymerization until 10% of the monomer(s) has been polymerized.” For at least the preceding reasons, it is respectfully submitted that the rejections under 35 U.S.C. §103(a) have been overcome and should therefore be withdrawn.



**IV. Conclusion**

In view of the preceding remarks, it is respectfully submitted that the application is in condition for allowance and prompt consideration is respectfully requested.

Respectfully submitted,  
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